



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

QUARTERLY PROGRESS REPORT

Project Title:	Rut Testing of Hot Mix Asphalt		
RFP NUMBER:		NJDOT RESEARCH PROJECT MANAGER: Mr. Nicholas Vitillo	
TASK ORDER NUMBER/Study Number: Task Order No. 98 / 4-26677		PRINCIPAL INVESTIGATOR: Dr. Ali Maher	
Study Start Date: 01/01/2001 Study End Date: 3/31/2003 (with NJDOT MOD in progress)		Period Covered: 1st Quarter 2003	

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Literature Search/Local Agency Survey	10%	25%	100%	10%
Lab Testing for Rutting Criteria	25%	20%	100%	25%
Lab Testing for NJ HMA Characterization	25%	25%	65%	16.25%
Lab Testing for SUPERPAVE vs Marshall	20%	15%	60%	12%
Field Calibration/Evaluation	10%	25%	25%	2.5%
Final Report	10%	35%	35%	3.5%
TOTAL	100%			69.25%

I. Progress this quarter by task:

- A. The second JMF of the Low Volume Road project has been completed. The following conclusions were drawn from the analysis:
1. The Marshall design conducted in the lab called for an asphalt content of 5.3%. The original JMF had called for 5.5%. The difference is most likely due to a change in the aggregate densities over the time from the original design to now. The optimum asphalt content was determined at 4.5% air voids.
 2. The Superpave design conducted in the laboratory called for an asphalt content of 5.3% at 4% air voids. This was identical to the Marshall design conducted in the laboratory. Therefore, the compaction energy from the Marshall (50 blows) was identical to the number of gyrations in the gyratory compactor (50 gyrations).
 3. The Superpave design passed all of the control points for the volumetric design except for the dust to binder ratio. The value obtained from the lab design was 1.4 (design is 0.6 to 1.2). Extra gyratory samples have been made to conduct APA testing for both this project, as well as laboratory verification of the APA Rutting Criteria.
 4. A Marshall design has been completed for a third Marshall design. The Superpave design is currently being worked on.
 5. As of the moment, the only change that would be recommended to the local aid would be to expand the dust to binder ratio up to 1.4. The field performance of the mixes has so far shown that this high of a dust to binder ratio is not detrimental to the performance of low volume roads.
- B. The APA Rutting Criteria has been completed based on the laboratory samples produced and the Port Authority's Heavy Volume Mixes for laboratory verification. An interim report for this separate portion of the project is currently being conducted. It is tentatively scheduled to be completed by the first of April. Some of topics of interest that have been evaluated and found in connection to this project are:
1. The fine mixes evaluated in the project performed as well or even better than the coarse mixes with respect to rutting. This was found in both the RSCH test, as well as the rutting parameter determined by the FSCH test.

Department of Civil and Environmental Engineering
623 Bowser Rd. Piscataway NJ 08854-8014
Tel : 732-445-0579 Fax: 732-445-0577

CAIT Confidential

Rut-Testing-of-HMA-QR-3-1-2003-FINAL.doc

Page 1 of 1



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

2. The permeability of the samples seems to be not only based on the aggregate gradation and air voids, but also on the binder type. Samples that have binders with higher viscosities have found to have lower permeabilities. Further testing is being conducted to validate this performance.
3. The comparisons between PG64-22, PG70-22, and PG76-22 have found that the bump-up to a PG70-22 lowers both the APA rutting and also the RSCH permanent shear strain. However, results from the FSCH tests show that the stiffness is similar. The reasoning behind this is that the FSCH parameter G^* , although a good method for determining elastic strain, does not take into account the permanent strain.
4. The rutting of samples with respect to air voids shows that as the high temperature PG grade increase, the effect of compaction of air voids decreases. In essence, by bumping up a binder grade, one can minimize or slow down the initial compaction due to traffic loading.

2. Proposed activities for next quarter by task:

- A. RSCH and FSCH tests will be further conducted on the samples (especially the fine gradations). Further analysis of the results should allow for the construction of a rutting criteria based on RSCH tests.
- B. The interim report for the APA Rutting Criteria should be finished and submitted to the NJDOT.
- C. The third Low Volume Road mix should be completed and the fourth mix started. The comparisons between the Marshall design and the Superpave designs will continue.

3. List of deliverables provided in this quarter by task (product date):

N/A

4. Progress on Implementation and Training Activities:

N/A

5. Problems/Proposed Solutions:

N/A

6. Budget Summary*

Total Project Budget(# of years)	2 Years	\$321,867.00
Total Project Expenditure to date		\$245,612
% of Total Project Budget Expended		76%
Task Order Number/Study Number:		98 / 4-26677
Current Task Order Budget (# of years)	Year 1 and 2	\$321,867.00
Actual Expenditure to date against current task order		\$245,612
% of current task order budget expended		76%

* These are approximate expended amounts for the project; these estimates are for reference only and should not be used for official accounting purposes. For a more accurate project accounting please review the quarterly invoice for this project.

Department of Civil and Environmental Engineering
623 Bowser Rd. Piscataway NJ 08854-8014
Tel : 732-445-0579 Fax: 732-445-0577